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## PCT INTERNATIONAL COOPERATION TREATY

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**NOTIFICATION OF TRANSMITTAL  
OF COPIES OF TRANSLATION  
OF THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

(PCT Rule 72.2)

From the INTERNATIONAL BUREAU

To:

ABB BUSINESS SERVICES LTD.  
Intellectual Property (SLE-I)  
Haselstrasse 16/699  
CH-5401 Baden  
SUISSE

<b>Date of mailing (day/month/year)</b> 16 August 2001 (16.08.01)	<b>IMPORTANT NOTIFICATION</b>
<b>Applicant's or agent's file reference</b> 98/277 WO	
<b>International application No.</b> PCT/CH99/00608	<b>International filing date (day/month/year)</b> 16 December 1999 (16.12.99)
<b>Applicant</b> ABB RESEARCH LTD. et al	

**1. Transmittal of the translation to the applicant.**

The International Bureau transmits herewith a copy of the English translation made by the International Bureau of the international preliminary examination report established by the International Preliminary Examining Authority.

**2. Transmittal of the copy of the translation to the elected Offices.**

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following elected Offices requiring such translation:

AU,CA,CN,JP,KP,KR,NZ,PL,US

The following elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

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**3. Reminder regarding translation into (one of) the official language(s) of the elected Office(s).**

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report.

**It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.**

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland	<b>Authorized officer</b>  Ali SOLEIMAN
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

10

Applicant's or agent's file reference 98/277 WO	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/CH99/00608	International filing date (day/month/year) 16 December 1999 (16.12.99)	Priority date (day/month/year) 28 December 1998 (28.12.98)
International Patent Classification (IPC) or national classification and IPC G01L 11/02		
Applicant ABB RESEARCH LTD.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.  <input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  These annexes consist of a total of _____ sheets.
3. This report contains indications relating to the following items:  I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 24 June 2000 (24.06.00)	Date of completion of this report 04 August 2000 (04.08.2000)
Name and mailing address of the IPEA/EP  Facsimile No.	Authorized officer  Telephone No.

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/CH99/00608

## I. Basis of the report

1. This report has been drawn on the basis of (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.):

☐ the international application as originally filed.

☒ the description, pages 1-14, as originally filed,  
pages \_\_\_\_\_, filed with the demand,  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

☒ the claims, Nos. 1-12, as originally filed,  
Nos. \_\_\_\_\_, as amended under Article 19,  
Nos. \_\_\_\_\_, filed with the demand,  
Nos. \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
Nos. \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

☒ the drawings, sheets/fig 1/10-10/10, as originally filed,  
sheets/fig \_\_\_\_\_, filed with the demand,  
sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

2. The amendments have resulted in the cancellation of:

☐ the description, pages \_\_\_\_\_

☐ the claims, Nos. \_\_\_\_\_

☐ the drawings, sheets/fig \_\_\_\_\_

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/CH 99/00608

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Claims	1-12	YES
	Claims		NO
Inventive step (IS)	Claims	1-12	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-12	YES
	Claims		NO

### 2. Citations and explanations

This report makes reference to the following documents:

- D1: US-A-5 042 898 (GLOMB WALTER L ET AL) 27 August 1991 (1991-08-27), cited in the application
- D2: US-A-4 761 073 (MELTZ GERALD ET AL) 2 August 1988 (1988-08-02), cited in the application
- D3: DE-C-196 48 403 (NAGEL THOMAS DR ING; WALL CHRISTIAN DIPL ING (DE)) 2 April 1998 (1998-04-02)
- D4: EP-A-0 466 623 (KARLSRUHE AUGSBURG IWEKA) 15 January 1992 (1992-01-15).

#### 1. Technical field of the invention

Fiber optic pressure sensors.

#### 2. Novelty (PCT Article 33(2))

D1 to D4 do not disclose the measurement of a pressure difference  $p_1 - p_2$  by converting the multidirectional pressures  $p_1$ ,  $p_2$  into a longitudinal expansion or compression of a fiber Bragg grating. The subject matter of Claim 1 is therefore novel (PCT Article 33(2)). Its use is therefore novel. Moreover, D1 to D4 also do not disclose the use of differential pressure measurement with a Venturi tube.

**3. Inventive step (PCT Article 33(3))**

3.1 D1, which is regarded as the closest prior art, discloses a fiber optic pressure sensor.

The subject matter of independent Claim 1 differs from the pressure sensor known from D1 essentially by the following features:

- the device is suitable in particular for measuring differential pressures and flow velocities in crude oil boreholes;
- the transducer is exposed to two different multidirectional pressures  $p_1$ ,  $p_2$ ;
- the transducer is configured for measuring a pressure difference  $p_1 - p_2$  by converting the multidirectional pressures  $p_1$ ,  $p_2$  into a longitudinal expansion or compression of a fiber Bragg grating.

The problem to be solved by the present invention can therefore be regarded as that of providing a fiber optic pressure sensor with a high isotropic pressure sensitivity.

None of the available documents suggests the specified distinguishing features in a fiber optic pressure sensor according to D1.

D2 and D3 disclose pressure sensors which do not detect isotropic pressure. D4 discloses a sensor without Bragg grating.

The subject matter of Claim 1 therefore involves an inventive step.

3.2 The use of a sensor according to Claim 12 is also inventive.

**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

International application No.

PCT/CH 99/00608

**4. Industrial applicability (PCT Article 33(4).)**

The present invention is clearly industrially applicable.

**5. Dependent claims**

Dependent Claims 2 to 11 relate to advantageous configurations of the device according to Claim 1 and are therefore also regarded as novel and inventive.